

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

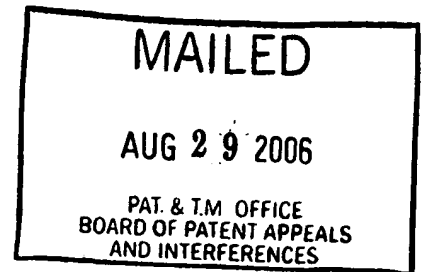
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RAJIV JAIN and RICHARD J. WONG

Appeal No. 2006-1997
Application No. 09/887,834

HEARD: August 9, 2006



Before KRASS, JERRY SMITH, and BLANKENSHIP, Administrative Patent Judges.

BLANKENSHIP, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-3, 5, 6, 9-17, and 21-23.

We reverse.

BACKGROUND

The invention relates to programmable elements useful in programmable read only memories, programmable logic devices, and programmable gate arrays that are known as antifuses. An antifuse is a structure that when unprogrammed does not electrically couple its first and second electrodes but which, when programmed, permanently electrically couples the first and second electrodes. The antifuse is programmed by applying sufficient voltage between its first and second electrodes. (Spec. at 1.) In appellants' invention, a first programming pulse having a lesser magnitude of current is applied before a second pulse of opposite polarity.

Representative claim 1 is reproduced below.

1. A method of programming an antifuse, said antifuse comprising a material that is substantially non-conductive when said antifuse is unprogrammed, said material being disposed between and in electrical contact with a first conductive element and a second conductive element, said method comprising:

passing a first pulse through said material so as to drive material from said first conductive element into said material as a conductive filament, said first pulse is a current limited pulse; and

passing a second pulse through said material in the opposite direction of said current limited pulse so as to drive material from said second conductive element into said material thereby increasing the cross sectional area of said conductive filament and reducing the resistance of said antifuse;

wherein the current in said current limited pulse is lower in magnitude than the current in said second pulse, and wherein said current limited pulse is passed through said material prior to any other pulse.

The examiner relies on the following reference:

Chan

5,243,226

Sep. 7, 1993

Claims 1-3, 5, 6, 9-17, and 21-23 stand rejected under 35 U.S.C. § 102 as being anticipated by Chan.

Claims 4, 19, and 20 have been allowed. Claims 7, 8, 18, 24, and 25 are objected to as being dependent on a rejected base claim.

We refer to the Final Rejection (mailed Jun. 5, 2003), the Examiner's Answer (mailed Jan. 27, 2004), and the Supplemental Answer (mailed Jan. 25, 2005) for a statement of the examiner's position and to the Brief (filed Oct. 24, 2003) and the Reply Brief (filed Mar. 23, 2004) for appellants' position with respect to the claims which stand rejected.

OPINION

We are in substantial agreement with appellants' arguments in the briefs and cannot sustain the standing rejection. Representative claim 1 recites, inter alia, that the current in the current limited (first) pulse is lower in magnitude than the current in the second pulse. The claim further makes clear that the current limited pulse is passed through the programmable material prior to any other pulse (i.e., represents the initial programming pulse with respect to the material). We agree that Chan fails to anticipate the subject matter of claim 1.

The Chan reference is discussed at page 2 of the instant specification. As noted therein, the best results in programming antifuses were believed to be achieved if the magnitude (with respect to current) of the second pulse is lower than the magnitude of

the first pulse. Chan describes, in column 1, what was believed in the prior art with respect to Chan; i.e., that a higher programming current provides a lower resistance. Chan's invention is based on the recognition that (as summarized at column 2, lines 30 through 37), contrary to the conventional wisdom, better results could be obtained if the magnitude of a second pulse of opposite polarity were lower than the magnitude of the first pulse.

The examiner seems to acknowledge that Chan's preferred embodiment of the invention is directly opposed to the above-quoted language of claim 1. However, the examiner's position seems to be that the disclosure would have conveyed to the artisan that programming would also occur, although perhaps with relatively less consistent results, if programming were performed in accordance with the above-noted requirements of instant claim 1. A reference is no less anticipatory if, after disclosing the invention, the reference then disparages it. Celeritas Techs. v. Rockwell Int'l Corp., 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522 (Fed. Cir. 1998). "A reference anticipates a claim if it discloses the claimed invention 'such that a skilled artisan could take its teachings in combination with his own knowledge of the particular art and be in possession of the invention.'" In re Graves, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995) (quoting In re LeGrice, 301 F.2d 929, 936, 133 USPQ 365, 372 (CCPA 1962)).

The rejection relies in particular on column 3, lines 65 and 66 of Chan, which states that "[c]urrent I2 reduces the antifuse resistance even if |I2| (the magnitude of I2)

is not higher than I1.” Upon consideration of the entirety of the reference, with particular emphasis on the sections relied upon by the examiner, we conclude that Chan fails to support the examiner’s finding.

We do not find any disclosure, express or inherent, whereby the current in an initial programming pulse is lower in magnitude than the current in a second pulse. The column 3 section of Chan, read in context, indicates that some reduction in antifuse resistance will be effected when the second pulse is the same magnitude as the first pulse, although without the lesser resistance and greater predictability achieved when the second pulse is lower in magnitude by 20% to 25% (col. 4, ll. 8-16).

We recognize there is a textual basis for the examiner’s interpretation of the reference in Chan’s statement at column 3, if the statement is considered in isolation. However, when the statement is read in light of the remainder of the teachings of Chan, a finding that Chan describes current pulses within the scope of instant claim 1 would be based on speculation. We find no hint or suggestion in the reference, contrary to the examiner’s implication, as to what might result if one were to cause the magnitude of the second pulse to be greater than that of the first pulse. Chan’s disclosure does not provide sufficient description for all three of the relevant possibilities; i.e., first pulse greater in magnitude, both pulses the same magnitude, and second pulse greater in magnitude. While Chan’s disclosure may be sufficient to anticipate two of the three possibilities, on this record we conclude the reference’s teachings are not sufficient to

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place the invention of instant claim 1 into public possession. Chan is thus outside the scope of the claim.

The remainder of the independent claims on appeal (9, 21, and 22) contain language similar to that in claim 1 that we consider, on this record, to distinguish over Chan. We thus do not sustain the rejection of claims 1-3, 5, 6, 9-17, and 21-23 under 35 U.S.C. § 102 as being anticipated by Chan.

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CONCLUSION

The rejection of claims 1-3, 5, 6, 9-17, and 21-23 under 35 U.S.C. § 102 is reversed.

REVERSED


ERROL A. KRASS
Administrative Patent Judge


JERRY SMITH
Administrative Patent Judge


HOWARD B. BLANKENSHIP
Administrative Patent Judge

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